

Kennedy NASA Procedural Requirements

Effective Date: July 20, 2017

Expiration Date: July 20, 2022

Responsible Office: Safety and Mission Assurance

KSC Personal Protective Equipment (PPE) Procedural Requirements

**National Aeronautics and
Space Administration**

John F. Kennedy Space Center

KDP-KSC-T-2120, Rev. Basic

Change Log

Date	Revision	Description
09/01/2004	Basic	New document.
05/18/2007	Basic 1	Administrative Change: Changed all NPGs to NPRs; changed all KHBs to KNPRs; changed KNPGs to KNPRs; corrected KNPR 1840.1, Industrial Hygiene to KNPR 1840.19, KSC Industrial Hygiene Programs; and added links.
07/22/2009	Cancel	Cancelled because the information was added to KNPR 8715.3, KSC Safety Practices Procedural Requirements.
07/13/2012	A	During the re-write of KNPR 8715.3, KSC Safety Practices Procedural Requirements, an opportunity to consolidate Center-level requirements in KNPR 8715.3 and KNPR 1840.19 was identified. KNPR 8715.5, Rev. A has consolidated the requirements for PPE
07/20/2017	B	Fall Protection PPE reference added. <i>Changes reflect recent inclusion of fall protection equipment into OSHA's General Industry Standard, Subpart I, as Personal Protective Equipment (PPE)"</i> Removed Chapter 4, Self-Contained Atmospheric Protective Ensemble (SCAPE) Requirements. These requirements are captured in KTI-1202, Propellant Handlers Ensemble User's Manual.
02/11/2021	B-Interim	This interim change aligns the KSC requirement for eye/face protection with industry standards. The ANSI/ISEA Z87.1 standard addresses the selection, use, and maintenance of eye and face protection devices for specific operations. This change clarifies requirements for eye/face protection and provides the strongest safety approach to minimize or prevent eye and face injuries for operations at KSC. In addition, PPE for electrical and biohazardous material was clarified by moving from Table A to separate sections as protective equipment is not limited to eye protection.

National Aeronautics and Space Administration

John F. Kennedy Space Center
Kennedy Space Center, FL 32899



Reply to Attn of: SA

TO: Kennedy Space Center Senior Management

FROM: SA/Director, Safety and Mission Assurance
SI/Director, Spaceport Integration and Services

SUBJECT: Interim Change to Kennedy NASA Procedural Requirements (KNPR)
8715.5, Revision B, KSC Personal Protective Equipment Procedural
Requirements

This interim change is to provide an update to KNPR 8715.5, KSC Personal Protective Equipment Procedural Requirements, until a new document revision is released. This interim change depicts clarification of existing requirements. The changes are contained in Enclosure 1.

If you have any questions, please contact Gary Hendricks at 321.867.8738 or by e-mail at gary.d.hendricks@nasa.gov.

JENNIFER KUNZ Digitally signed by JENNIFER
KUNZ
Date: 2020.10.22 15:06:02 -04'00'

Jennifer C. Kunz
Director, Safety and Mission Assurance

NANCY BRAY Digitally signed by NANCY
BRAY
Date: 2020.10.23 09:19:07 -04'00'

Nancy P. Bray
Director, Spaceport Integration and Services

Enclosures:

1. Interim Change to KNPR 8715.5, KSC Personal Protective Equipment Procedural Requirements
2. KNPR 8715.5, Revision B, KSC Personal Protective Equipment (PPE)

Enclosure 1

Interim Policy Change to Kennedy NASA Procedural Requirement (KNPR) 8715.5, Kennedy Space Center (KSC) Personal Protective Equipment (PPE) Procedural Requirements

Interim Change 1:

INTERIM REQUIREMENT

2.2 SELECTION

The selection and usage of appropriate PPE is an extremely important process and requires an understanding of the workplace hazard(s) associated with the task, the level of protection required, and the physical and health capability of the employee using the PPE. The use of PPE is based on the specific hazards present, the type of operation to be performed, and the level of protection provided by the PPE.

- a. The PPE selected shall provide adequate protection for the employee while enabling the employee to perform the task or operation safely.

Note 1: For General Industry, PPE will be selected and used in accordance with [29 Code of Federal Regulations \(CFR\) 1910, Subpart I - PPE](#).

Note 2: For Construction Industry, PPE will be selected and used in accordance with Occupational Safety and Health Administration ([OSHA](#)) [29 CFR 1926, Subpart E, Personal Protective and Life Saving Equipment](#), and [29 CFR 1926, Subpart M, Fall Protection](#).

Note 3: Guidelines for selection of specific PPE for chemical protection may be found in "Recommendations for Chemical Protective Clothing - A Companion to the National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards."

Note 4: Recommended PPE for common operations are listed in Table A.

Table A: Recommended PPE		
	Hazards to Consider	Recommended PPE
Hand/Arm Protection	Skin exposure to solvents, pesticides, acids, caustic or corrosive liquids, other chemicals	Chemical resistant gloves. Contact NASA Environmental and Medical Contract (NEMCON) Environmental Health to conduct hazard assessment to identify exposure levels and identify required PPE
	Handling tools or materials likely to cause scrapes, cuts, or bruises	Metal mesh, leather, canvas, Kevlar material or cloth gloves
	Skin contact with hot surfaces	Oven mitts, leather or aluminized gloves, arm protection
	Cryogenic liquids, skin contact with cold surfaces	Cryogenic mitts, leather gloves
Foot/Leg/Body Protection	Hazards to feet related to sharp or heavy objects/equipment	Metatarsal guards, toe guards, combination foot-toe guards, safety shoes
	Splash/splatter/spray of chemicals or biological materials	Tyvek garment, rubberized apron, chemical splash garment, and chemical resistant boots. Contact NEMCON Environmental Health for hazard assessment and PPE requirement
	Fire/Explosive Hazard	Pre-approved flame resistant, anti-static coveralls, and non-porous shoes
Head Protection	Danger of head injury from impact, falling or flying objects, including work under elevated work platforms, suspended loads or low overhead clearance	Hard hats American National Standards Institute (ANSI) Z89.1-1986, including reduction of electric shock

Table A: Recommended PPE		
	Hazards to Consider	Recommended PPE
Hearing Protection	Refer to KNPR 1820.3, KSC Hearing Loss Prevention Program	Refer to KNPR 1820.3, KSC Hearing Loss Prevention Program
Respiratory Protection	Refer to KNPR 1820.4, KSC Respiratory Protection Program	Refer to KNPR 1820.4, KSC Respiratory Protection Program
Fall Protection	Refer To KSC-STD-S-0033, Kennedy Space Center (KSC) Fall Protection Standard	Refer To KSC-STD-S-0033, Kennedy Space Center (KSC) Fall Protection Standard
SCAPE	Refer to Kennedy Technical Instruction (KTI)-1202, Propellant Handlers Ensemble Manual	KTI-1202, Propellant Handlers Ensemble Manual

b. In accordance with [29 CFR 1910.132](#), employers will provide the PPE at no cost to the employees. Therefore employee-provided PPE shall not be allowed.

(New) c. Eye/Face Protection shall be selected based on the following criteria:

(1) During operations where there is potential for exposure to liquid splash/droplets/spray/mist or dusts/fumes from hazardous chemicals:

(a) The employee shall wear chemical goggles with an ANSI/International Safety Equipment Association (ISEA) Z87.1 rating of D3.

(b) The potential for exposure to liquid splash/droplets/spray shall be considered anytime a chemical that is defined by the Safety Data Sheet (SDS) as being injurious to the eyes is actively being transported, decanted, transferred between containers, actively flowing, heated, mixed, titrated, or manually manipulated.

Note: Chemicals considered injurious to the eyes are defined as Globally Harmonized System of Classification and Labeling of Chemicals (GHS) category 1 eye damage and 2A eye irritant on the SDS.

(2) During operations when there is potential for liquid splash or spray while working with corrosive or hot liquids, goggles with an ANSI/ISEA Z87.1 rating of D3 and a face shield shall be worn.

Note: Hot liquids are defined as greater than 125 degrees Fahrenheit (F).

(3) The sash of the fume hood shall not replace the need for the required PPE.

(4) During operations involving cryogenic liquids, the employee shall wear goggles with an ANSI/ISEA Z87.1 rating of D3 and a full-face shield.

(5) During operations involving high pressure cleaning or spraying:

(a) The employee shall wear goggles with an ANSI/ISEA Z87.1 rating of D3.

(b) The use of a face shield as supplementary PPE shall be determined based on results of a hazard analysis.

(6) During operations resulting in airborne dust or fine dust, the employee shall wear ANSI/ISEA Z87.1 D4 (dust) or D5 (fine dust) rated goggles.

Note: Dust is defined as solid particles greater than or equal to 75 microns (µm) in diameter. Fine dust is defined as particles below 75 µm in diameter.

(7) During operations involving acetylene welding, cutting, burning, or molten metals, the employee shall wear ANSI/ISEA Z87.1 approved cutting goggles with a filter lens as determined using the table in ANSI/ISEA Z87.1.

(8) During operations involving arc welding and cutting, the employee shall wear ANSI/ISEA Z87.1 approved safety glasses with side shields and welding hood with filter lens as determined using the table in ANSI/ISEA Z87.1.

(9) During operations resulting in flying particles from, but not limited to chipping, grinding, drilling, or machining:

(a) The employee shall wear ANSI/ISEA Z87.1 impact rated goggles or safety glasses with side shields.

(b) The use of a face shield as supplementary PPE shall be determined based on results of a hazard analysis.

(New) d. During electrical operations, the employee shall comply with National Fire Protection Association (NFPA) 70E, "Standard for Electrical Safety in the Workplace," PPE requirements as determined by shock hazard and arc flash risk assessment.

(New) e. During operations where there is potential for splashes, spray, spatter, or droplets of biohazardous materials, the employee shall wear goggles in addition to other required PPE corresponding to the Biological Safety Level of biomaterials as defined in Centers for Disease Control (CDC) Biosafety in Microbiological and Biomedical Laboratories, United States Department of Health and Human Services (HHS) Publication No. 21-1112.

CURRENT REQUIREMENT

2.2 SELECTION

The selection and usage of appropriate PPE is an extremely important process and requires an understanding of the workplace hazard(s) associated with the task, the level of protection required, and the physical and health capability of the employee using the PPE. The use of PPE is based on the specific hazards present, the type of operation to be performed, and the level of protection provided by the PPE.

a. The PPE selected shall provide adequate protection for the employee while enabling the employee to perform the operation.

Note 1: For General Industry, PPE will be selected and used in accordance with [29 CFR 1910, Subpart I - PPE](#).

Note 2: For Construction Industry, PPE will be selected and used in accordance with [OSHA 29 CFR 1926, Subpart E, Personal Protective and Life Saving Equipment](#), and [29 CFR 1926, Subpart M, Fall Protection](#).

Note 3: Guidelines for selection of specific PPE for chemical protection may be found in "Recommendations for Chemical Protective Clothing - A Companion to the NIOSH Pocket Guide to Chemical Hazards."

Note 4: Recommended PPE for common operations are listed in Table A.

b. In accordance with [29 CFR 1910.132](#), employers will provide the PPE at no cost to the employees. Therefore employee-provided PPE shall not be allowed.

Table A: Recommended PPE		
	Hazards to Consider	Recommended PPE
Eye/Face Protection	Splash/splatter/spray of chemicals or biological materials; cryogenic liquids	Chemical goggles or safety glasses with side shields covered by a full-face shield
	High pressure cleaning or spraying	Chemical goggles covered by a full-face shield
	Drilling – any flying particles or projectiles	Goggles or safety glasses with side shields
	Power tools (air or electrical)	Safety glasses with side shields
	Typical laboratory – chemical splash	Chemical goggles
	Acetylene welding, cutting, burning, molten metals	Cutting goggles with appropriate filter lens numbers
	Arc welding and cutting	Safety glasses with side shields and welding hood with appropriate filter lens numbers
	Chipping, grinding, or machining – flying particles	Face shield and either goggles or safety glasses with side shield
	Electrical	National Fire Protection Association (NFPA) 70E PPE requirements and other as determined by high voltage/arc flash analysis
Hand/Arm Protection	Skin exposure to solvents, pesticides, acids, caustic or corrosive liquids, other chemicals	Chemical resistant gloves. Contact Kennedy Environmental and Medical Contract (KEMCON) Environmental Health to conduct hazard assessment to identify exposure levels and identify required PPE
	Handling tools or materials likely to cause scrapes, cuts, or bruises	Metal mesh, leather, canvas, Kevlar material or cloth gloves
	Skin contact with hot surfaces	Oven mitts, leather or aluminized gloves, arm protection
	Cryogenic liquids, skin contact with cold surfaces	Cryogenic mitts, leather gloves
	Exposure to exposed high voltage electrical wiring, etc.	Electrical insulating rubber gloves per electrical safety specifications
	Electrical	NFPA 70E PPE requirements and other as determined by high voltage/arc flash analysis
Foot/Leg/ Body Protection	Hazards to feet related to sharp or heavy objects/equipment	Metatarsal guards, toe guards, combination foot-toe guards, safety shoes
	Splash/splatter/spray of chemicals or biological materials	Tyvek garment, rubberized apron, chemical splash garment, and chemical resistant boots. Contact KEMCON Environmental Health for hazard assessment and PPE requirement.
	Fire/Explosive Hazard	Pre-approved flame resistant, anti-static coveralls, and non-porous shoes.
	Electrical	Safety shoes, NFPA 70E PPE requirements and other as determined by high voltage/arc flash analysis
Head Protection	Danger of head injury from impact, falling or flying objects, including work under elevated work platforms, suspended loads or low overhead clearance	Hard hats (ANSI 289.1-1986), including reduction of electric shock
	Electrical	NFPA 70E PPE requirements and other as determined by high voltage/arc flash analysis
Hearing Protection	Refer to KNPR 1820.3 (KSC Hearing Loss Prevention Program)	Refer to KNPR 1820.3 (KSC Hearing Loss Prevention Program)
	Electrical	NFPA 70E PPE requirements and other as determined by high voltage/arc flash analysis
Respiratory Protection	Refer to KNPR 1820.4 (KSC Respiratory Protection Program)	Refer to KNPR 1820.4 (KSC Respiratory Protection Program)

Table A: Recommended PPE		
	Hazards to Consider	Recommended PPE
Fall Protection	Refer To KSC-STD-S-0033, Kennedy Space Center (KSC) Fall Protection Standard	Refer To KSC-STD-S-0033, Kennedy Space Center (KSC) Fall Protection Standard
SCAPE	Refer to KTI-1202, Propellant Handlers Ensemble Manual	KTI-1202, Propellant Handlers Ensemble Manual

ADDITIONAL INFORMATION

- This interim change aligns the KSC requirement for Eye/Face Protection with industry standards. The ANSI/ISEA Z87.1 standard addresses the selection, use, and maintenance of eye and face protection devices for specific operations.
- KNPR 8715.5, section 2.2.c establishes the approach from ANSI/ISEA Z87.1, thereby eliminating the “guesswork” of looking into the standard and making those determinations. This provides the strongest safety approach to minimize or prevent eye and face injuries for operations at KSC. This interim change provides clarification of requirements and removes references to eye/face protection in Table A.
- Electrical PPE was moved to section 2.2.d, as protective equipment for electrical operations is not limited to eye protection. This interim change provides clarification of requirements and removes references to electrical PPE in Table A.
- PPE for biohazardous materials was moved to section 2.2.e and incorporates reference to Centers for Disease Control (CDC) Biosafety in Microbiological and Biomedical Laboratories, HHS Publication No. 21-1112. This interim change removes references to biological materials in Table A.
- Correct typographical error for ANSI hard hat reference to ANSI Z89.1-1986.

Table of Contents

PREFACE.....	10
P.1 PURPOSE.....	10
P.2 APPLICABILITY	10
P.3 AUTHORITY	10
P.4 APPLICABLE DOCUMENTS AND FORMS	10
P.5 MEASUREMENT/VERIFICATION.....	11
P.6 CANCELLATION.....	11
CHAPTER 1: GENERAL	12
1.1 GOAL	12
1.2 OBJECTIVE.....	12
1.3 RESPONSIBILITY	12
1.4 CHANGE RECOMMENDATIONS.....	12
1.5 EXCLUSIONS.....	13
CHAPTER 2: PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS	14
2.1 OVERALL PROGRAM REQUIREMENTS	14
2.2 SELECTION	14
2.3 DECONTAMINATION/CONTAMINATED DISPOSABLE WASTE	16
2.5 INSPECTION.....	16
CHAPTER 3: TRAINING	17
APPENDIX A: DEFINITIONS	18
APPENDIX B: ABBREVIATIONS AND ACRONYMS	19

PREFACE

P.1 PURPOSE

a. This Kennedy National Aeronautics and Space Administration (NASA) Procedural Requirements (KNPR) document contains Kennedy Space Center (KSC) requirements for the use of Personal Protective Equipment (PPE). Federal Occupational Safety and Health Administration (OSHA) regulations drive NASA's PPE requirements. The requirements contained herein combine guidance from the NASA Industrial Hygiene (IH) Program and NASA KSC Safety and Mission Assurance (S&MA) that highlights or exceeds OSHA PPE requirements.

b. The purpose of this document is to provide employees with a safe environment in which hazards are identified, evaluated, eliminated or controlled in such a manner that personnel do not suffer injuries/illnesses as a result of their employment.

P.2 APPLICABILITY

a. This KNPR applies to all NASA organizational elements located at KSC, NASA organizational elements located at United States Air Force's 45th Space Wing locations, and personnel at NASA-KSC controlled facilities and NASA-KSC operations at other locations. This includes associated contractors, other government agencies and their contractors, and tenants to the extent specified in their respective contracts or agreements.

b. In this directive, all mandatory actions (i.e., requirements) are denoted by statements containing the term "shall." The terms "may" or "can" denote discretionary privilege or permission, "should" denotes a good practice and is recommended, but not required, "will" denotes expected outcome, and "are/is" denotes descriptive material.

c. In the event of a conflict between the requirements set forth in this document and any other applicable document, the more stringent requirements apply.

P.3 AUTHORITY

- a. [Title 29, Code of Federal Regulations \(CFR\)](#)
- b. [Executive Order 12196, Occupational Safety and Health Program for Federal Employees](#)
- c. [NASA Policy Directive 8700.1, NASA Policy for Safety and Mission Success](#)
- d. [NASA Procedural Requirements \(NPR\) 8715.1, NASA Occupational Safety and Health Program](#)
- e. [NPR 8715.3, NASA General Safety Program Requirements](#)

P.4 APPLICABLE DOCUMENTS AND FORMS

- a. [KSC-STD-S-0033, KSC Fall Protection Standard](#)
- b. [KNPR 1820.3, KSC Hearing Loss Prevention Program](#)

- c. [KNPR 1820.4, KSC Respiratory Protection Program](#)
- d. [KNPR 8500.1, KSC Environmental Requirements](#)
- e. [KTI 1202 Propellant Handlers Ensemble User's Manual](#)
- f. NIOSH Pocket Guide to Chemical Hazards

P.5 MEASUREMENT/VERIFICATION

- a. Compliance with the requirements contained in this KNPR will be verified through normal surveillance, audit, and assessment activities performed by the NASA S&MA organization. NASA safety personnel or their designees have the right to enter any NASA KSC-controlled facility to monitor operations in order to accomplish this verification. These safety personnel are subject to safety practices and reasonable security requirements.
- b. Implementation of this KNPR by support organizations (i.e., NASA contractors and partners) will be subject to periodic surveillance (audit, assessment, or other) by the NASA KSC S&MA.

P.6 CANCELLATION

This document cancels KNPR 8715.5, Rev. B, KSC Personal Protective Equipment (PPE) Procedural Requirements.

/original signed by/

William Russ DeLoach
Director, Safety and Mission Assurance

/original signed by/

Nancy P. Bray
Director, Spaceport Integration and Services

CHAPTER 1: GENERAL

1.1 GOAL

- a. PPE is used as a protective barrier between an individual employee and physical hazards, hazardous materials, or hazardous agents in the workplace. PPE shall be required when administrative or engineering controls have been shown to be infeasible or inadequate in eliminating or mitigating safety and health hazards (e.g., chemical, radiological, physical, electrical, mechanical).
- b. The use of PPE shall not be considered a substitute for engineering or administrative controls. PPE is intended to shield individual workers from hazards and hazardous environments that cannot be reduced or eliminated by any other control methods.
- c. Applicable Industry Standards shall be used to the extent practical to meet OSHA, National Institute for Occupational Safety and Health (NIOSH), and NASA design and operational needs.

1.2 OBJECTIVE

The objective of this KNPR is to establish Center PPE requirements to satisfy Federal guidelines, industry standards, and when necessary, to apply more stringent requirements to ensure the safety and health of personnel at KSC.

1.3 RESPONSIBILITY

- a. KSC Environmental and Medical Contract (KEMCON) IH Office shall provide technical assistance in the selection of health-related PPE.
- b. S&MA is available to provide technical assistance in the selection and design of engineering controls and work practices and assist with the selection of safety-related PPE.
- c. Contractor organizations shall prepare written policies and procedures required for implementation of this KNPR.
- d. PPE shall be used, maintained, and stored as required by the manufacturer.
- e. The interpretation of the requirements in this KNPR is the responsibility of the IH Office and the appropriate S&MA division. The Director of S&MA and the Director of Spaceport Integration and Services are the final authorities for interpretation of these requirements.

1.4 CHANGE RECOMMENDATIONS

- a. Change recommendations involving this document shall be submitted to the point-of-contact identified in TechDoc.
- b. The recommendation shall identify the exact language of the proposed change and the rationale for the change.

Note: S&MA will ensure proper review and disposition of all change recommendations using the Kennedy Action Tracking System (KATS) when necessary.

1.5 EXCLUSIONS

This KNPR does not address the following PPE requirements areas:

- a. PPE requirements associated with hearing conservation (addressed in [KNPR 1820.3, KSC Hearing Loss Prevention Program](#)).
- b. PPE requirements associated with respiratory protection are addressed in KNPR 1820.4, KSC Respiratory Protection Program.
- c. Self-Contained Atmospheric Protective Ensemble (SCAPE) requirements are covered in KTI-1202, Propellant Handlers Ensemble User's Manual.

CHAPTER 2: PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

2.1 OVERALL PROGRAM REQUIREMENTS

Written PPE programs shall include at a minimum:

- a. A hazard assessment that:
 - (1) Identifies task-based hazards and appropriate engineering, administrative, work practice controls, and required PPE.
 - (2) Re-evaluates PPE selection identified in the hazard assessment when changes in requirements, procedures, or exposure to hazards might alter its effectiveness.
- b. Methods to ensure applicable PPE requirements are incorporated into written operation procedures or other applicable instructions.
- c. Provisions for training and informing employees who utilize PPE.
- d. A process to inform employees when there are workplace changes or other considerations are identified.

2.2 SELECTION

The selection and usage of appropriate PPE is an extremely important process and requires an understanding of the workplace hazard(s) associated with the task, the level of protection required, and the physical and health capability of the employee using the PPE. The use of PPE is based on the specific hazards present, the type of operation to be performed, and the level of protection provided by the PPE.

- a. The PPE selected shall provide adequate protection for the employee while enabling the employee to perform the operation.

Note 1: For General Industry, PPE will be selected and used in accordance with [29 CFR 1910 subpart I - PPE](#).

Note 2: For Construction Industry, PPE will be selected and used in accordance with OSHA [29 CFR 1926](#), Subpart E, Personal Protective and Life Saving Equipment and [29 CFR 1926, Subpart M, Fall Protection](#).

Note 3: Guidelines for selection of specific PPE for chemical protection may be found in "Recommendations for Chemical Protective Clothing - A Companion to the "NIOSH Pocket Guide to Chemical Hazards".

Note 4: Recommended PPE for common operations are listed in Table A.

- b. In accordance with [29 CFR 1910.132](#), employers will provide the PPE at no cost to the employees. Therefore employee-provided PPE shall not be allowed.

Table A: Recommended PPE

	Hazards to Consider	Recommended PPE
Eye / Face Protection	Splash/splatter/spray of chemicals or biological materials; cryogenic liquids	Chemical goggles or safety glasses with side shields covered by a full-face shield
	High pressure cleaning or spraying	Chemical goggles covered by a full-face shield
	Drilling – any flying particles or projectiles	Goggles or safety glasses with side shields
	Power tools (air or electrical)	Safety glasses with side shields
	Typical laboratory – chemical splash	Chemical goggles
	Acetylene welding, cutting, burning, molten metals	Cutting goggles with appropriate filter lens numbers
	Arc welding and cutting	Safety glasses with side shields and welding hood with appropriate filter lens numbers
	Chipping, grinding, or machining – flying particles	Face shield and either goggles or safety glasses with side shield
	Electrical	National Fire Protection Association (NFPA) 70E PPE requirements and other as determined by high voltage/arc flash analysis
Hand / Arm Protection	Skin exposure to solvents, pesticides, acids, caustic or corrosive liquids, other chemicals	Chemical resistant gloves. <i>Contact KEMCON Environmental Health to conduct hazard assessment to identify exposure levels and identify required PPE</i>
	Handling tools or materials likely to cause scrapes, cuts, or bruises	Metal mesh, leather, canvas, Kevlar material or cloth gloves
	Skin contact with hot surfaces	Oven mitts, leather or aluminized gloves, arm protection
	Cryogenic liquids, skin contact with cold surfaces	Cryogenic mitts, leather gloves
	Exposure to exposed high voltage electrical wiring, etc.	Electrical insulating rubber gloves per electrical safety specifications
	Electrical	NFPA 70E PPE requirements and other as determined by high voltage/arc flash analysis
Foot / Leg / Body Protection	Hazards to feet related to sharp or heavy objects/equipment	Metatarsal guards, toe guards, combination foot-toe guards, safety shoes
	Splash/splatter/spray of chemicals or biological materials	Tyvek garment, rubberized apron, chemical splash garment, and chemical resistant boots. <i>Contact KEMCON Environmental Health for hazard assessment and PPE requirement.</i>
	Fire/Explosive Hazard	Pre-approved flame resistant, anti-static coveralls, and non-porous shoes.
	Electrical	Safety shoes, NFPA 70E PPE requirements and other as determined by high voltage/arc flash analysis
Head Protection	Danger of head injury from impact, falling or flying objects, including work under elevated work platforms, suspended loads or low overhead clearance	Hard hats (ANSI 289.1-1986), including reduction of electric shock
	Electrical	NFPA 70E PPE requirements and other as determined by high voltage/arc flash analysis
Hearing Protection	Refer to KNPR 1820.3 (KSC Hearing Loss Prevention Program)	Refer to KNPR 1820.3 (KSC Hearing Loss Prevention Program)
	Electrical	NFPA 70E PPE requirements and other as determined by high voltage/arc flash analysis
Respiratory Protection	Refer to KNPR 1820.4 (KSC Respiratory Protection Program)	Refer to KNPR 1820.4 (KSC Respiratory Protection Program)
Fall Protection	Refer To KSC-STD-S-0033, Kennedy Space Center (KSC) Fall Protection Standard	Refer To KSC-STD-S-0033, Kennedy Space Center (KSC) Fall Protection Standard
SCAPE	Refer to KTI-1202, Propellant Handlers Ensemble Manual	KTI-1202, Propellant Handlers Ensemble Manual.

2.3 DECONTAMINATION/CONTAMINATED DISPOSABLE WASTE

- a. Requirements for decontamination or cleaning shall be in accordance with the manufacturer's recommendation.
- b. Contaminated disposable PPE (e.g., splash suits, gloves, booties) shall be disposed of as hazardous waste where designated as such by the Waste Management Authority, as defined in [KNPR 8500.1](#).

2.4 INSPECTION

- a. Personnel shall inspect PPE prior use in accordance with manufacturers' instructions and applicable safety standards, whichever is more stringent, to ensure the integrity of the equipment.
- b. Protective clothing and gloves shall be inspected prior to each use for leaks, imperfect seams, nonuniform coating, tears, cracks, pinholes, deterioration, last tested, use date, and shelf life.

CHAPTER 3: TRAINING

a. Employees shall be trained to recognize potential hazards and the means to protect themselves from such hazards in their workplace.

b. Once PPE has been determined through the hazard assessment and selection process, employees who use PPE and their supervisors shall be trained on the applicable types of PPE that will be used.

c. PPE training shall be accomplished before PPE usage and cover the following topics:

(1) When PPE is necessary in the workplace.

(2) What type(s) of PPE are necessary for different workplace tasks?

Note: In many cases, more than one type of PPE will provide adequate protection. In those cases, workers should be given a choice of PPE.

(3) Limitations of various types of PPE, as well as proper PPE maintenance, useful life, and disposal.

(4) How properly don and doff the PPE.

(5) Instruction on the proper use, care, and inspection, of PPE, per the manufactures instructions ([29 CFR 1910.132 for general industry and 29 CFR 1926.28 for construction](#)).

d. Training for management representatives supervising operations involving health hazards shall include:

(1) Regulatory and KSC requirements for hazard control measures.

(2) Identification of potential hazards and how to request a hazard assessment or Health Hazard Evaluation.

e. Safety representatives or other employees delegated safety responsibility shall be capable of performing the functions of their assigned areas of responsibility, including:

(1) Identification of hazards in the work area and recognition of potential exposures.

(2) Procedures for requesting a hazard or IH evaluation for potential hazards that are identified.

(3) Procedures for reporting employee exposures, mishaps, and accidents involving hazards.

(4) Use and care of required PPE.

(5) Use and care of monitoring equipment, as required.

APPENDIX A: DEFINITIONS

Corrosive - A chemical that causes visible destruction of or irreversible alterations in living tissue.

Engineering Control - Any design procedure that eliminates or controls exposure to chemical or physical hazards by substitution of less hazardous materials or processes or preventing the escape of hazardous materials or physical agents into the workplace.

Exposure - The process by which a chemical or physical agent enters the body through any route of entry including inhalation, ingestion, injection, or absorption through the skin. Potential for exposure exists where air contaminants are present or where hazardous materials can come into contact with the skin.

Hazardous Chemical or Hazardous Material - Chemicals or materials with dangerous health or physical properties.

Health Hazard - A chemical or physical agent where it is established that acute or chronic injury or illness may occur in exposed employees, based upon statistically significant evidence in at least one study conducted in accordance with scientific principles.

Industrial Hygiene - The profession devoted to the prevention of occupational illness or disease associated with exposures to hazardous materials and physical agents.

Occupational Safety and Health Administration - A United States Department of Labor regulatory and enforcement agency created for the implementation of the Occupational Safety and Health Act of 1970.

Physical Agent - Physical factors such as heat, ultraviolet and ionizing radiation, humidity, noise, magnetic fields, or abnormal pressure and the like which may constitute a health hazard.

APPENDIX B: ABBREVIATIONS AND ACRONYMS

CFR	Code of Federal Regulations
IH	Industrial Hygiene
KEMCON	KSC Environmental and Medical Contract
KNPR	Kennedy NASA Procedural Requirements
KSC	Kennedy Space Center
NASA	National Aeronautics and Space Administration
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NPR	NASA Procedural Requirements
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
S&MA	Safety and Mission Assurance
SCAPE	Self-Contained Atmospheric Protective Ensemble